CORDYCEPSCICADAE-FERMENTED PRODUCT CULTURED WITH DEEP OCEAN WATER IMPROVES MEMORY DEFICIT IN AMYLOID BETA 40 AND STREPTOZOTOCIN-INDUCED ALZHEIMER'S DISEASE RAT VIA INHIBITING INFLAMMATORY FACTORS EXPRESSION

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Abstract - Alzheimer's disease (AD) is a common neurodegenerative disease characterized by continuous accumulation of β-amyloid (Aβ) in the brain, resulting in neurons damage, formation of senile plaques, and neurofibrillary tangles, as well as memory and cognitive dysfunction. Deep ocean water (DOW) with rich inorganic salts and minerals can be used as a source of mineral supplements for the human body. In the past, it was discovered that the imbalance of mineral elements in the body was considered to cause the diseases. DOW with rich magnesium and calcium ions was proven to regulate lipid metabolism and improve liver damage. Cordyceps cicadae NTTU 868, a functional fungi, can produce higher anti-oxidant and anti-inflammatory compounds including adenosine, polysaccharide and N(6)-(2-Hydroxyethyl) adenosine. Using DOW as the culture water can increase the functional compounds and functional effect of C. cicadae NTTU 868.This study used C. cicadae NTTU 868 as experimental strains to culture with ultrapure water and deep ocean water for producing UPW-CC and DOW-CC, respectively. They were further compared and investigated the effects and mechanisms on improving the memory deficit and repressing risk factors expressions in Aβ40 and streptozotocin (STZ) -induced Alzheimer's disease rats model.In the result, DOW-CC has more effect on the improvement of memory deficit than UPW-CC. Furthermore, the decreased magnesium levels in hippocampus and cortex were resumed by DOW-CC, but not UPW-CC. Daily feeding DOW-CC effectively reduced the accumulation of Aβ40 in the brain, and further reduced the expression of AD-related risk factors BACE. Furthermore, DOW-CC performed higher prevention against Aβ40-induced inflammatory response than UPW-CC via repressing microglial cell activation factor sRAGE, and proinflammatory factor expression (TNF-α, IL-1β, IL-6).

Keywords - Alzheimer's disease, deep ocean water, Cordyceps cicadae, Streptozotocin.